Lesson Plan 6—Mathematics

Overview

The purpose of these activities is to introduce students to census of agriculture tables and concepts in mathematics using the data in the tables. Students will learn how to use the tables while using math skills (addition, subtraction, multiplication, and division). Also, students will be introduced to percentages and rounding of numbers.

- **Suggested grades 7-12**
- **Suggested time 3-4 Days**

Learning Objectives

Students will learn how to read census of agriculture tables by:

1. Performing mathematic operations (addition, subtraction, rounding of numbers, calculating percentages, etc.)
2. Learning the concept of greater than ">," less than "<," and equal "="
3. Reading numbers correctly in an oral exercise

Materials Needed

Copies of Activity 1, Activity 2, Activity 3, and Activity 4 Handouts

From the Appendix: Copies of "Table 1. Historical Highlights: 1987 and Earlier Census Years;" "Table 2. Market Value of Agricultural Products Sold: 1987, 1982, and 1978;" and "Table 16. Tenure and Characteristics of Operator and Type of Organization for All Farms and Farms Operated by Black and Other Races: 1987, 1982, and 1978."

Getting Started

Introduce this lesson to your students by discussing some of the data presented in tables 1, 2, and 16 (located in the appendix). Explain that the census of agriculture collects information on agriculture production, major operator characteristics, sales, and inventories.

The major purpose of these activities is to give your students training in reading and understanding census of agriculture data tables. The math lessons presume that students have a fundamental understanding of math skills. The math skills required in these lessons are the understanding of addition, subtraction, multiplication, and division.

Instructors may choose to use the supplemental sheets for activity 1 and activity 4 for some students. The supplemental sheets are supplied as a tool for teachers to give the students to let them know if they have used the correct numbers from the tables. We suggest that you first let students set up the problems using only the tables. If they have problems understanding the tables, then supply the supplemental sheet as a guide.

Lesson Plan 6
Activity 1 - Handout

Mathematical Operations Using Census Data

Use "Table 1. Historical Highlights: 1987 and Earlier Census Years" to complete this exercise. Refer to the data under the section titled "Farms by value of sales" for questions 1-3.

1. What was the number of farms with value of sales less than $10,000 in census year 1987?

2. What was the number of farms with value of sales equal to or greater than $10,000 in census year 1987?

3. What was the number of farms with value of sales $2,500 to $9,999 in 1978?

Use "Table 1. Historical Highlights: 1987 and Earlier Census Years" and refer to the data "Farms by size" for questions 4-7.

4. How many farms were 1,000 acres or more in 1987?

5. How many farms were 49 acres or less in 1987?

6. How many farms were 1,000 acres or more in 1978?

7. How many farms were 180 to 499 acres in 1974?

Use "Table 1. Historical Highlights: 1987 and Earlier Census Years" and refer to the data "Farms . . . . . number" under the column "All farms" for question 8.

8. What is the difference in the number of farms between census year 1987 and census year 1974?

Use "Table 16. Tenure and Characteristics of Operator and Type of Organization for All Farms and Farms Operated by Black and Other Races: 1987, 1982, and 1978" and refer to the data "Operators by sex" for question 9.

9. The census of agriculture records the principal operator of a farm or ranch by sex (male or female). There were 2,087,059 operators in 1987. There were 1,956,118 male operators. How many operators were female?

Use "Table 16. Tenure and Characteristics of Operator and Type of Organization for All Farms and Farms Operated by Black and Other Races: 1987, 1982, and 1978" and refer to the data "Operator by age group" for questions 10, 11, and 12.

10. How many operators were 55 to 64 years of age in 1987?

11. How many operators were 49 years of age or younger in 1982?

12. What is the difference between the average age of an operator in census year 1987 and census year 1982?

Use "Table 16. Tenure and Characteristics of Operator and Type of Organization for All Farms and Farms Operated by Black and Other Races: 1987, 1982, and 1978" and refer to the data "Tenure of operator" under the heading "Farms operated by Black and other races" for question 13.

13. What is the difference in the number of farms operated by "Black and other races" between census year 1987 and census year 1978?

Use "Table 16. Tenure and Characteristics of Operator and Type of Organization for All Farms and Farms Operated by Black and Other Races: 1987, 1982, and 1978" and refer to the data "Type of Organization" under the heading "Farms operated by Black and other races" for questions 14 and 15.

14. What is the total number of farms operated by "Black and other races" that were individual or family (sole proprietorship) operations and partnerships in 1987?

15. What is the total number of acres of farms that were family held corporations operated by "Black and other races" in census year 1987?

Lesson Plan 6
Activity 2 - Handout

Greater Than (>), Less Than (<), or Equal (=)

Use "Table 1. Historical Highlights: 1987 and Earlier Census Years" for this activity. Indicate whether the comparative value is greater than, less than, or equal for the following statements.

_____ 1. Was the number of farms with 2,000 acres in census year 1987 greater than or less than the number of farms with 2,000 acres in census year 1964?

_____ 2. Was the amount of irrigated land (acres) in census year 1987 greater than or less than the amount of irrigated land (acres) in census year 1978?

_____ 3. Was the number of farms that reported broilers and other meat-type chickens sold in census year 1987 greater than or less than the number of farms that reported broilers and other meat-type chickens sold in census year 1959?

_____ 4. Was the number of beef cows in census year 1987 greater than or less than the number of beef cows in census year 1982?

_____ 5. Was the number of hogs and pigs sold in census year 1974 greater than or less than the number of hogs and pigs sold in census year 1954?

_____ 6. Was the average age of an operator in 1982 greater than, less than, or equal to the average age of an operator in 1959?

_____ 7. In reference to farms that grew tobacco, was the number of acres in 1987 greater than or less than the number of acres in 1982?

_____ 8. In reference to land in orchards, was the number of acres in 1987 greater than or less than the number of acres in 1978?

Lesson Plan 6
Activity 3 - Handout
Exercise 1

Reading a Table in Thousands of Dollars

Many values in the 1987 Census of Agriculture publications are written in thousands of dollars, such as market value of agricultural products sold, farm production expenses, and estimated market value. An item in a table may look like the following:

Estimated market value of all machinery and equipment . . . . . $1,000 _____ 85,801,360

If you ignore the "$1,000" (thousands), you are not reading the number correctly. The value for the above example is eighty-five billion, eight hundred and one million, three hundred and sixty thousand dollars (85,801,360,000).

If you see $1,000 in the stub or boxhead of a census of agriculture publication table, you should add three zeroes at the end of the number to read it correctly.

Match the following values for "Selected farm production expenses" using "Table 1. Historical Highlights: 1987 and Earlier Census Years."

_____ 1. Livestock and poultry purchased	a. 19,344,645
_____ 2. Feed for livestock and poultry	b. 19,163,364
_____ 3. Commercial fertilizer	c. 6,684,944
_____ 4. Petroleum products	d. 5,277,227
_____ 5. Hired farm labor	e. 10,866,236
_____ 6. Interest expense	f. 8,158,268
_____ 7. Agricultural chemicals	g. 4,690,243

Lesson Plan 6
Activity 3 - Handout
Exercise 2

Rounding Numbers

In the chart below, round the farm numbers to the nearest million, hundred thousand, ten thousand, thousand, or hundred, as indicated, for each census year.

Example:

beef cow inventory for the census years 1987 and 1982

1987 - 95,847,299 beef cows (rounded to the nearest million = 96,000,000)

1982 - 104,475,827 beef cows (rounded to the nearest hundred thousand = 104,500,000)

Census Year	Number of Farms	Indicated Value	Rounded Value
1987	2,087,759	nearest million	_____
1982	2,240,976	nearest hundred thousand	_____
1978	2,257,775	nearest ten thousand	_____
1974	2,314,013	nearest thousand	_____
1969	2,730,250	nearest hundred	_____
1964	3,157,857	nearest thousand	_____
1959	3,710,503	nearest million	_____
1954	4,782,416	nearest hundred thousand	_____

Lesson Plan 6
Activity 4 - Handout

Calculating Percents

Use "Table 2. Market Value of Agricultural Products Sold: 1987, 1982, and 1978" to complete this exercise. Show your work and calculations for all math problems.

1. **The total market value of agricultural products sold for 1987 was $136,048,516,000. The market value of products sold for livestock, poultry, and their products was $77,117,431,000.**

   In 1987, what percentage of the total market value of agricultural products sold is attributed to livestock, poultry, and their products?

2. **The total market value of agricultural products sold for 1982 was $131,900,223,000. The market value of agricultural products sold for crops, including nursery and greenhouse crops was $62,256,087,000.**

   What percentage of the 1987 total market value of agriculture products sold is attributed to crops, including nursery and greenhouse crops in 1982?

3. **The market value of corn for grain was $10,671,890,000 in 1987.**

   What percentage of the 1987 total market value of agricultural products sold is attributed to corn for grain in 1987?

4. **The market value of dairy products sold was $16,029,195,000 in 1987 and $16,320,417,000 in 1982.**

   a. In 1987, what percentage of the total market value of agricultural products sold is attributed to dairy products?

   b. In 1982, what percentage of the total market value of agricultural products sold is attributed to dairy products?

5. **The market value of fruits, nuts, and berries was a little over seven billion dollars in 1987. It accounted for 5.2 percent of total sales.**

   In 1982, what percentage of the total market value of agricultural products sold is attributed to fruits, nuts, and berries?

Lesson Plan 6
Supplemental Sheet for Activity 1

Using this supplemental sheet as a guide, locate the numbers in the table and then perform the mathematical operation that is required in the problem.

1.	Less than $2,500	490,296
	$2,500 to $4,999	262,918
	$5,000 to $9,999	274,972
2.	$10,000 to $24,999	326,166
	$25,000 to $49,999	219,636
	$50,000 to $99,999	218,050
	$100,000 to $499,999	263,698
	$500,000 or more	32,023
3.	$2,500 to $4,999	300,699
	$5,000 to $9,999	314,088
4.	1,000 to 1,999 acres	102,078
	2,000 acres or more	66,786
5.	1 to 9 acres	183,257
	10 to 49 acres	412,437
6.	1,000 to 1,999 acres	97,800
	2,000 acres or more	63,301
7.	180 to 499 acres	_____
8.	Census year 1974	2,314,013
	Census year 1987	-2,087,759
9.	All Operators	2,087,759
	Male Operators	-1,956,118
	Female Operators	

10. 55 to 59 years	247,908	247,908
60 to 64 years	247,908	x 2
11. Under 25 years	62,336	
25 to 34 years	293,810	
35 to 44 years	443,420	
45 to 49 years	505,412	
12. Average age in 1987	52.0	
Average age in 1982	-50.5	
13. Census year 1978	57,988	
Census year 1987	-44,640	
14. Individual or family	38,903	
Partnership	3,546	
15. More than 10 stockholders	44,902	
10 or less stockholders	677,797	

Lesson Plan 6
Supplemental Sheet for Activity 4

Using this supplemental sheet as a guide, locate the numbers in the table and then perform the mathematical operation that is required in the problem

1. (77,117,431,000/136,048,516,000) X 100 =

2. (62,256,087,000/131,900,223,000) X 100 =

3. (10,671,890,000/136,048,516,000) X 100 =

4. a. (16,029,195,000/136,048,516,000) X 100 =

   b. (16,320,417,000/131,900,223,000) X 100 =

5. (5,846,095,000/131,900,223,000) X 100 =

Lesson Plan 6
Answer Sheet

Activity 1

Mathematical Operations Using Census Data

1. 1,028,186 farms
2. 1,059,573 farms
3. 614,787 farms
4. 168,864 farms
5. 595,694 farms
6. 161,101 farms
7. 616,098 farms
8. 226,254 farms
9. 131,641 female operators
10. 495,816 operators
11. 1,304,978 operators
12. 1.5 years
13. 13,348 farms
14. 42,449 farms
15. 722,699 acres

Activity 2

Greater Than, Less Than, or Equal

1. >
2. <
3. <
4. <
5. >
6. =
7. <
8. >

Lesson Plan 6
Activity 3
Answer Sheet

Exercise 1

Reading a Table

1. g
2. c
3. b
4. e
5. a
6. f
7. d

Exercise 2

Rounding Numbers

2,000,000
2,200,000
2,260,000
2,314,000
2,730,300
3,158,000
4,000,000
4,800,000

Activity 4

Calculating Percents

1. (77,117,431,000/136,048,516,000) X 100 = 56.7%
2. (62,256,087,000/131,900,223,000) X 100 = 47.2%
3. (10,671,890,000/136,048,516,000) X 100 = 7.8%
4. a. (16,029,195,000/136,048,516,000) X 100 = 11.8%
   b. (16,320,417,000/131,900,223,000) X 100 = 12.4%
5. (5,846,095,000/131,900,223,000) X 100 = 4.4%